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Inside this issue:

Above: Geoffroy's horseshoe bat (*Rhinolophus clivosus* Cretzschmar, 1828) photographed in the Vredefort Dome area of the North West Province, South Africa during March 2007.

Notes from the Editor:

I would like to remind readers of the purpose of African Bat Conservation News:

"*The Vision of African Bat Conservation News is to create a forum where observations, notes, ideas and discussions on conservation of bats in Africa can be published. African Bat Conservation News is not intended to replace any existing scientific journal, but aims to complement research on bats in Africa*." (African Bat Conservation News 1: 1).

African Bat Conservation News should be seen as a tool that can be used to share and debate information, ideas or problems individuals are experiencing.

The Scientific section of the newsletter is slowly gaining support, and these articles are also being cited more regularly in papers published in traditional scientific journals. But, to achieve the overall vision the following areas of the newsletter need more support.

Research and Conservation: This section is intended for those involved in bat research and conservation projects to be able to inform others of their work. This can be done from the outset of a project, with updates over time of the projects progress.

This section can also be used to allow networking between people where assistance is being sought. For instance, a request for bat bugs published in African Bat Conservation News (2005 3: 2) has produced its first collaborative work in the publication of REINHARDT, K., and JACOBS, D.S., 2006. Abundance of *Cacodmus vilosus* (Stal, 1855) (Heteroptera: Cimicidae) on its host, *Neoromicia capensis* (Chiroptera: Vespertillionidae). *African Entomology* **14(2)**: 398-400.

Debates and Updates: The debates part of this section allows people to pose statements/questions/opinions around a bat issue, to which readers are encouraged to respond in writing to the editor for their response to be published in subsequent newsletters. Although some issues may be very controversial, I have been told *a well cut diamond has 64 angles to it, and all complex issues – in life and in ecology - similarly appear to have 64 or more angles to them, and only if all angles are understood and factored in appropriately can we have a "diamond".*

The updates section is intended to allow updating of results already published in the newsletter. Hence, when survey results are published with field numbers and identifications for voucher specimens (as is requested by African Bat Conservation News), it is hoped that in time when museum accession numbers become available, and identifications are made based on prepared voucher specimens, or other techniques (e.g. molecular, chromosome, bacular), this information will be published in the updates section. This updated information would assist in correcting errors, should identifications change from those made in the field, and in accessing material from museum collections. This section can also be used to publish details of voucher specimens used in research, should a journal not allow the publication of a lengthy appendix. **- Ernest C.J. Seamark**

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SCIENTIFIC CONTRIBUTIONS

African Bat Conservation News publishes brief notes concerning the biology of bats, new geographical distributions (preferably at least 100 km from the nearest previously published record), sparsely annotated species lists resulting from local surveys including roost counts and echolocation and sonograms of bat species occurring on the African continent and adjacent regions, including the Arabian peninsula, Madagascar, and other surrounding islands in the Indian and Atlantic oceans.

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A CHIROPTERAN SURVEY OF THE LAC KINKONY-MAHAVAVY AREA IN WESTERN MADAGASCAR

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Key words: bat survey; Lac Kinkony-Mahavavy, western Madagascar

Although bats form a large component of tropical biodiversity (e.g. HUTSON *et al.* 2001; SIMMONS 2005) they were omitted from many of the vertebrate surveys conducted in Madagascar during the 1990s, which were designed to assess the biodiversity of sites of potential conservation importance. Only recently have surveys on the island started to uncover the true diversity of the chiropteran fauna (e.g. GOODMAN *et al.* 2005b, 2006) and to compile detailed information on the bats from protected areas (GOODMAN *et al.* 2005a). Associated with its karstic geology, the west of Madagascar is reported to be particularly important for bat diversity and, as this region received less attention from biologists than the humid east, additional surveys are required.

As part of a multi-disciplinary team organized by Birdlife International Madagascar Programme, we surveyed the bats of the Lac Kinkony-Mahavavy forest-wetland complex (Province de Mahajanga) during February and March 2006. Although noted for its wetland bird community, this unprotected area also has important areas of deciduous dry forest. There was no prior information available about the bats of this specific area, although sites to the north and south have been surveyed (GOODMAN *et al.* 2005a).

Materials and Methods

We surveyed forests and caves in four areas (Analamanitra, Antsilaiza-Anjahamena, Marofandroboka and Anjohibe) within the Lac Kinkony-Mahavavy forest-wetland complex. We conducted 5, 4, 4, and 3 trapping nights at these sites, respectively. According to the availability of sites to place mist nets our effort varied between 21 and 30 m of mist nets per night. All nets were either 6 m or 9 m in length and were set close to the ground in forest gaps, along forest trails and edges, and near water. Nets were checked regularly and extracted bats were stored in cloth bags for a short period before processing. We also visited all reported or potential bat roosts based on information from local people and our own field observations. Voucher specimens were identified using keys and taxonomic descriptions (GOODMAN *et al.* 2005b, GOODMAN 2006, PETERSON *et al.* 1995) and were deposited in the Département de Biologie Animale, Université d'Antananarivo (Appendix I). *Scotophilus* were identified using external measurements; with *Scotophilus marovaza* Goodman, Ratrimomanarivo and Randrianandrianina, 2006, the smallest species (forearm length < 45 mm).

Results

In total, nine bat species were found during the survey, two Megachiroptera and seven Microchiroptera. Two *Pteropus rufus* E. Geffroy St.-Hilaire, 1803 day roosts were discovered in small groves; one on an island in a freshwater lake (Maroandravy), and the other (Ambatomaraha) on a rocky outcrop. The roost at Ambatomaraha consisted of approximately 1,000 bats whilst the population at Maroandravy was estimated to be around 400 individuals. Local people reported regular movement of bats between the two sites. Informal conversations with people who were familiar with the *P. rufus* at Ambatomaraha reported that a group of eight men visit the roost for periods of two to three nights and use canopy nets to capture the bats. Up to 100 are reportedly caught on each visit and taken to nearby markets and sold for USD 0.5 each to local restaurants.

A single cave roost of the small fruit bat *Rousettus madagascariensis* G. Grandidier, 1929 was discovered in Madiromasina and was estimated to contain over 5,000 individuals.

A total of 189 bats of eight species were mist netted whilst active at night (Table 1). *Rousettus madagascariensis* was the most commonly caught species and represented 32% of all captures. A single *Triaenops furculus* Trouessart, 1906 was netted. Species richness varied from six to eight per site. *Rousettus madagascariensis* and *Hipposideros commersoni* (E. Geoffroy St.-Hilaire, 1813) were captured at all areas surveyed.

Captures of *R. madagascariensis*, *Myotis goudoti* (A. Smith, 1834), *Triaenops* spp. and *Miniopterus manavi* Thomas, 1906 were higher in forest than village or savanna habitats (Table 2). *Myotis goudoti* and *T. furculus* were the only species that were not trapped outside of forest habitats. *Myzopoda schliemanni* Goodman, Rakotondraparany and Kofoky, 2007 was captured most frequently in degraded forest. For *R. madagascariensis*, high capture rates appeared to be related to the proximity of the cave roost (Table 2). Approximately half of the *S. marovaza* and *H. commersoni* captures were from sites near trees in the vicinity of villages.

Six microchiropteran roosting sites were discovered during the survey. At Analamanitra, 57 *T. rufus* Milne-Edwards, 1881 were netted as they emerged from Anjohikalanoro Cave. Further exploration of this roost was not possible due to local taboos associated with the site. At Marofandroboka, we netted eight *Miniopterus manavi* at Ambohibory Cave and estimated there were approximately 150 individuals inside. In four caves at Anjohibe, colonies of *M. manavi* ranged in size from 20 to 1000 individuals.

Table 1. Results of mist netting at four forest sites in the Kinkony-Mahavavy forest-wetland complex in western Madagascar during February-March 2006.

Species	Number of individuals caught			
	Analamanitra (126 net m)	**Antsilaiza (111 net m)**	**Marofandroboka (114 net m)**	**Anjohibe (75 net m)**
Rousettus madagascariensis	10	6	6	60
Hipposideros commersoni	6	5	3	1
Triaenops rufus	3	2	20	13
Triaenops furculus	0	0	0	1
Scotophilus marovaza	12	6	2	0
Myotis goudoti	1	0	9	4
Miniopterus manavi	0	0	2	1
Myzopoda schliemanni	5	5	6	0
Total bats caught	37	24	48	80
Bats/net meter	0.29	0.22	0.42	1.01
Species richness	6	5	5	6

Table 2. Results of mist netting in five different habitat types from four forest sites at the Kinkony-Mahavavy forest-wetland complex in western Madagascar during February-March 2004.

Species	Bat captures				
	Village (51 net m)	**Savannah (15 net m)**	**Degraded forest (231 net m)**	**Relatively intact forest (75 net m)**	**Riparian forest (54 net m)**
Rousettus madagascariensis	2	5	12	40	23
Hipposideros commersoni	6	1	2	1	1
Triaenops rufus	5	1	19	6	8
Triaenops furculus	0	0	0	1	0
Scotophilus marovaza	9	1	8	0	2
Myotis goudoti	0	0	8	4	1
Miniopterus manavi	1	0	1	1	0
Myzopoda schliemanni	1	1	12	0	2
Total bats caught	24	9	62	53	37
Bats/net meter	0.47	0.60	0.27	0.71	0.69
Species richness	6	5	7	6	6

Discussion

Nine bat species were recorded from the Kinkony-Mahavavy forest-wetland complex representing a unique community composition for Madagascar. Although the species richness was lower than other sites on karstic substrate in western Madagascar, considerably greater survey effort was used during previous surveys (GOODMAN *et al.* 2005a) and it is likely that repeat visits to the Mahavavy-Kinkony complex will reveal previously unrecorded species. In particular, given the presence of limestone caves, bats such as *Otomops madagascariensis* (Dorst, 1953) and *Emballonura tiavato* Goodman, Cardiff, Ranivo, Russell, and Yoder, 2006 would be expected to occur at the site.

In terms of conservation, the Kinkony-Mahavavy complex appears to be important for bats. Although there is debate as to the extent to which Malagasy bats require intact forest habitats for their survival (GOODMAN *et al.* 2005), our results reported here and from other studies (e.g. KOFOKY *et al.* in press; RANDRIANANADRIANANINA *et al.* 2006) indicate that some species do have a close association with forest vegetation. Our results suggest that *Myotis goudoti* and *T. furculus*, two cave-roosting species, are associated with forest habitats and the forests of the Kinkony-Mahavavy complex provide important feeding areas for bats.

Myzopoda schliemanni is a recently described species (GOODMAN *et al.* 2007) and its conservation status is unknown. However, it appears to have a restricted distribution within western Madagascar and all captures are from sites that have native forest (GOODMAN *et al.* 2007). Capture rates of *M. schliemanni* in our survey are the highest reported and forested wetland habitats, such as at Kinkony-Mahavavy, may represent important habitats for this species.

Other species of conservation interest include *P. rufus*, *R. madagascariensis* and *H. commersoni* as all are threatened by hunting in Madagascar (GOLDEN 2005, GOODMAN 2006, MACKINNON *et al.* 2003). *Pteropus rufus* is listed as vulnerable on the IUCN Red List and is threatened across its range (MACKINNON *et al.* 2003). These bats play important

roles in maintaining forest ecosystems in Madagascar (BOLLEN and DONATI 2006; BOLLEN and VAN ELSACKER 2002) but populations are subject to heavy and sustained hunting. Roosts, such as Ambatomaraha, with a thousand *Pteropus* are becoming less common in Madagascar and such sites need to be conserved to preserve the bats and the ecological services they provide. Fruit bats can be legally hunted in Madagascar between May and September and their meat is a popular and important source of protein in the west. More information is needed on the dynamics of the bat-bushmeat trade in this region to ensure that any conservation plans are developed in an appropriate socio-economic context.

Measures to conserve the roosts at Ambatomaraha and Maroadravy could focus on establishing sustainable hunting practices in the former and reinforcing protection through the sacred taboos in the latter. Local people reported that the Maroadravy roost often contains over 1,000 bats when hunters are present at the Ambatomaraha roost. This highlights that local taboos can provide effective refuges for *P. rufus* and this may be particularly important as this species rarely roosts within existing protected areas. In addition, movement between Ambatomaraha and Maroadravy illustrates roost lability in *P. rufus* and conservation measures should include all known roosting and foraging sites within a given region.

Rousettus madagascariensis is regularly netted in the forests of western Madagascar (GOODMAN *et al.* 2005a) but very few roost sites are known to biologists (MACKINNON *et al.* 2003). The cave near the Anjohibe forest is the only reported roost site between Parc National Tsingy de Bemaraha and Anjohibe (Mahajanga), a distance of 370 km, and appears to be one of the largest roosting colonies known for the island. Although no evidence of hunting was found at this site, presumably because the cave is protected by local taboos, this species is subject to hunting pressure elsewhere in Madagascar (e.g. GOLDEN 2005).

Bats may use a variety of roosting sites in western Madagascar, including caves (KOFOKY *et al.*, 2006), tree cavities (ANDRIAFIDISON *et al.* 2006) and houses (GOODMAN *et al*. 2006). *Scotophilus marovaza* has been reported roosting in roofs constructed of *Bismarckia nobilis* leaves (GOODMAN *et al.* 2006). This species was never caught in relatively intact forest but was the most frequently trapped bat in and around villages. The roosting preferences of *Myzopoda* spp. remain a mystery and there are only two published observations under natural conditions, one from the leaves of *Ravenala madagascariensis* in the east (cited in SCHLIEMANN and MAAS 1978) and the other from a cave in the west (KOFOKY *et al.* 2006). More information is needed on the precise roosting requirements of the bats in the Kinkony-Mahavavy complex so that important sites can be protected and managed.

Bat conservation priorities in the Kinkony-Mahavavy are therefore as follows:

(i) Monitor the occupancy and population size of *P. rufus* roosts
(ii) Consider developing a sustainable approach to hunting at the Ambatomaraha *P. rufus* roost,
(iii) Assist the local community to protect the Maroandravy *P. rufus* roost and give due credit to the existing taboos as effective conservation measures,
(iv) Conduct a more detailed bat survey of the caves,
(v) Encourage vigilance at the Madiromasina 1 Cave against the commencement of hunting *Rousettus*,
(vi) Conserve the essential feeding and roosting habitats/features used by bats.

Acknowledgements

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Appendix 1: Voucher specimens collected during survey.

Species	Field Number	Sex	Capture location
Hipposideros commersoni	RBJ 253	M	S 16°03'11.7'' E 045°48'47.4''
Miniopterus manavi	RBJ 261	F	S 16°05'34.4'' E 045°51'39.9''
Miniopterus manavi	RBJ 264	F	S 16°01'18.2'' E 046°00'42.7''
Myotis goudoti	RBJ 259	M	S 16°02'39.5'' E 045°48'14.8''
Myotis goudoti	RBJ 262	F	S 16°05'09.9'' E 045°52'24.8''
Myzopoda schliemanni	RBJ 258	M	S 16°02'39.5'' E 045°48'14.8'
Myzopoda schliemanni	RBJ 260	F	S 16°02'43.4'' E 045°54'18.0''
Myzopoda schliemanni	RBJ 254	M	S 16°03'11.7'' E 045°48'47.4''
Rousettus madagascariensis	RBJ 251	F	S 16°03'11.7'' E 045°48'47.4''
Scotophilus marovaza	RBJ 247	M	S 16°03'11.7'' E 045°48'47.4''
Scotophilus marovaza	RBJ 248	F	S 16°03'11.7'' E 045°48'47.4''
Scotophilus marovaza	RBJ 249	F	S 16°03'11.7'' E 045°48'47.4''
Scotophilus marovaza	RBJ 250	F	S 16°03'11.7'' E 045°48'47.4''
Triaenops furculus	RBJ 263	F	S 16°01'56.6'' E 046°00'23.0'
Triaenops rufus	RBJ 252	F	S 16°03'11.7'' E 045°48'47.4''
Triaenops rufus	RBJ 255	F	S 16°03'44.4'' E 045°47'35.3''
Triaenops rufus	RBJ 256	F	S 16°03'44.4'' E 045°47'35.3''
Triaenops rufus	RBJ 257	M	S 16°03'44.4'' E 045°47'35.3''

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BAT INVENTORIES OF THE MADAGASCAR OFFSHORE ISLANDS OF NOSY BE, NOSY KOMBA AND ILE SAINTE-MARIE

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Key words: Madagascar, bats, Nosy Be, Nosy Komba, Ile Sainte-Marie

Since the publication of the monograph of PETERSON *et al*. (1995) on the bats of Madagascar, considerable effort has been made by different groups of researchers to document species richness and advance aspects of the ecology and systematics of the Malagasy chiropteran fauna. Numerous inventories of poorly known or completely unknown areas of the island have been conducted, and, in part, based on the associated voucher specimens, a number of microchiropteran species new to science have been discovered and described (e.g., GOODMAN and CARDIFF 2004, GOODMAN *et al*. 2005, 2006a, 2006b, 2007, *in press*, BATES *et al*. 2006). In order to understand the origin of this fauna and to place its colonization and dispersal history in a larger context, a series of inventories are being conducted on the bats of other islands in the western Indian Ocean, as well as offshore islands of Madagascar. Specimens and tissue samples, for associated nucleotide studies, are critical to unravel many of these biogeographic aspects (GOODMAN *et al*. 2006a, RUSSELL *et al*. 2007).

In the context of these inventories, we conducted surveys of the bats of three offshore islands of Madagascar – Nosy Be (26 December 2005 to 2 January 2006, 7 to 13 February 2006, and 16 February to 5 March 2006) and Nosy Komba (14 to 15 February 2006) off the northwest coast and Ile Sainte-Marie (16 March to 9 April 2006) off the central eastern coast (Figure 1). There are few published records of bats from these islands and, as described herein, several of these are in error. Herein we describe the different bat species recorded on these three islands and present a few details on capture rates and biogeography.

Bats were captured with a variety of devices and in different ecological settings, including native forest, forest edge, and anthropogenic areas (e.g., along rivers in open habitat, savannah habitat and near and within villages) (RAKOTONANDRASANA *submitted*). Associated with the capture of synanthropic species we generally used harp traps placed near the openings of day roosts. Surveys of the bats occurring in different habitats were made with varying configurations of mist nets, almost exclusively 2.6 high x 12 m mist nets with 4 panels and 36 mm mesh. Effort was calculated as the period of time a net was deployed and this figure is expressed as net-meter-hour (NMH). For example, one 12 m net opened for 6 hours resulted in 72 NMH of effort (1 x 12 m x 6 h). In a few cases, we visit caves and bats were captured by hand. Voucher specimens are housed in the Département de Biologie Animale, Université d'Antananarivo and the Field Museum of Natural History, Chicago.

Based on these inventories, 10 different species of bats were documented on Nosy Be, five species on Nosy Komba, and four species on Ile Sainte-Marie (Table 1). All identifications, in part with the exception of *Pteropus rufus* E. Geoffroy St.-Hilaire, 1803, are based on museum voucher specimens. Of these taxa, several were captured in the context of day roosts in synanthropic settings, but in all cases, these species were also netted in free-flying situations. These synanthropic species include: *Emballonura tiavato* Goodman,

Table 1: The known bat faunas of three offshore islands of Madagascar. Verified specimen records are noted with "+" and non-vouchered records with "obs.".

Species	Nosy Be	Nosy Komba	Ile Sainte-Marie
Family Pteropodidae			
Pteropus rufus	+	obs.	+
Rousettus madagascariensis	+	+	+
Family Emballonuridae			
Emballonura atrata	-	-	+
E. tiavato	+	+	-
Family Molossidae			
Chaerephon leucogaster	+	+	-[2]
C. pumilus	+	-	-
Mops leucostigma	+	obs.[1]	-
M. midas	+	-	-[2]
Family Hipposideridae			
Hipposideros commersoni	+	-	-
Family Vespertilionidae			
Miniopterus gleni	-	-	+
M. manavi	+	+	-[3]
Myotis goudoti	+	+	-[2]
Total number of species	**10**	**5**	**4**

[1] Individuals of this taxon occupied a tomb at the edge of the village Ampangorinana. For several different reasons bats were not captured at this site.
[2] Previously reported from this island by PETERSON *et al.* (1995), but the collection locality is in error – see text.
[3] There are two older specimens of this taxon held in the Field Museum - see text. It was not found during our survey of this island.

Cardiff, Ranivo, Russell, and Yoder, 2006 on Nosy Be attaching to the smooth concrete vertical walls of an infrequently used building in a rural setting, and *Chaerephon leucogaster* (A. Grandidier, 1869) and *Mops leucostigma* (G.M. Allen, 1918) on both Nosy Be and Nosy Komba in abandoned and occupied buildings in towns, villages, and rural settings. Colonies of the latter two species were often very common within schools and hospitals, and their role as reservoirs of different diseases that could be transmitted to humans warrants serious investigation, as Dakar Bat and the unidentified Mg An 963 strain viruses have been isolated from Malagasy Molossidae (COULANGES *et al*. 1974, CASSEL-BERAUD *et al*. 1989, FONTENILLE 1989, ROUSSET and ANDRIANARIVELO 2003).

In the literature on the bats of Madagascar, several previous accounts are mentioned for Ile Sainte-Marie (see compiled list of PETERSON *et al*. 1995). These include records of *Chaerephon leucogaster, Mops midas* (Sundevall, 1843), and *Myotis goudoti* (A. Smith, 1834) based on specimens collected on this island by W. Kaudern. Although Kaudern indeed visited Ile Sainte-Marie during his voyage to Madagascar between November 1911 and March 1912, these records, based on verification of the original reference (KAUDERN 1915), are from Sainte-Marie de Marovoay and not

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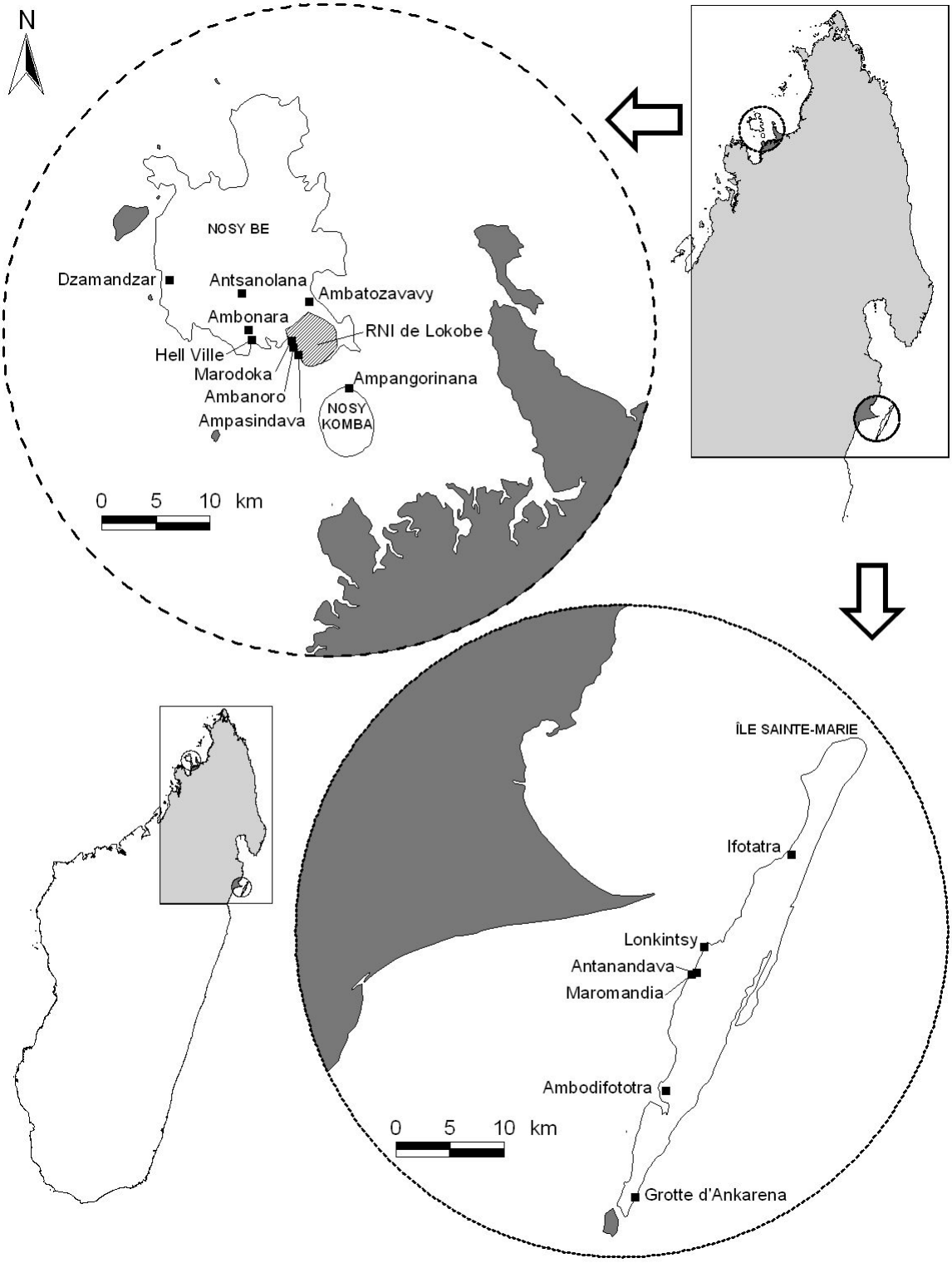

Figure 1. Map of different islands off Madagascar. The portion in the upper right is the northern portion of the island showing the position of the upper left inset of Nosy Be and Nosy Komba and the lower right inset of Ile Sainte-Marie.

Ile Sainte-Marie. Sainte-Marie de Marovoay is in the dry deciduous region of the west, within the Mahajanga Province, at the edge of the Parc National d'Ankarafantsika, and thus records of these taxa on Ile Sainte-Marie, following KAUDERN (1915), are invalid. Aside from the error in assigning specimens collected by KAUDERN (1915) on Ile Sainte-Marie, the only species mentioned in the literature as occurring on this island that we did not find are *Hipposideros commersoni* (E. Geoffroy St.-Hilaire, 1813) and *Miniopterus fraterculus* Thomas and Schwann, 1906, specimens of the latter are held in the Field Museum (PETERSON *et al*. 1995); these animals were found at Antanandava. One of our netting sites was within 1 km of this village. Two *Miniopterus* specimens in the Field Museum collection (FMNH 75772, 75773) from Antanandava are not referable to *M*. *fraterculus*, but rather *M*. *manavi* Thomas, 1906 (GOODMAN *et al*. *in press*).

The previous record of *Emballonura atrata* Peters, 1874 on Nosy Be (WALKER 1975), is actually of *E*. *tiavato* (GOODMAN *et al*. 2006a). PETERSON *et al*. (1995) and GOODMAN (1993) mentioned the occurrence of *Pteropus rufus* on Nosy Be and Ile Sainte-Marie, and populations still occur on these islands. At dusk *Pteropus* could be observed flying from Ile Sainte-Marie towards the main island, a minimum distance of 7 km. In the Kalalao Forest of Ile Sainte-Marie, populations of this species are regularly exploited by hunters and they are served seasonally in restaurants at Ambodifototra (RAKOTONANDRASANA and GOODMAN *unpublished*). One of the hunters, who possesses a 16-gauge shotgun, indicated in an interview that frozen *Pteropus* are exported to the main island provincial capital of Toamasina.

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Table 2: Number of individuals captured at each of the three different islands with mist nets. The measures of net-meter-hour (NMH) are presented.

Species	Nosy Be	Nosy Komba	Ile Sainte-Marie
Total NMH	3909	193	6749
Rousettus madagascariensis	119	25	24
Emballonura atrata	-	-	6
E. tiavato	1	5	-
Chaerephon leucogaster	2	-	-
C. pumilus	3	-	-
Mops leucostigma	1	-	-
M. midas	6	-	-
Hipposideros commersoni	1	-	-
Miniopterus manavi	2	1	-
Myotis goudoti	6	3	-
Total number of species	9	4	2
Total number captured	141	34	30
Capture rate	3.6 %	17.6 %	0.4%

On Nosy Be, nets were installed in forested portions of the Réserve Naturelle Intégrale de Lokobe (total NMH = 180) and no species of bat was captured in these settings that was not netted in more open and secondary habitats. The single individual of *Hipposideros commersoni* obtained on this island was in a secondary and disturbed zone, with some native trees, near the village of Marodoka.

Our only record of *Miniopterus gleni* Peterson, Eger and Mitchell, 1906 obtained during these island surveys is from Ile Sainte-Marie, in the Ankarena Cave, which serves as a day-roost. These individuals were found roosting in groups of 2-6 individuals in very shallow crevices and within 20 m of the cave entrance. A colony of approximately 200-300 *Rousettus madagascariensis* G. Grandidier, 1929 was observed at the same site, this species is hunted by local people for the esteemed bush meat. Based on interviews with our local guide, who is one of the exploiters of this resource, bat hunters from different portions of Ile Sainte-Marie usually visit this cave, to obtain *Rousettus*, in the months of November to December and May when the bats are "notably fat." The principal method of capturing *Rousettus*, which involves 4 to 5 people, generally young adults, is for two hunters to throw wood sticks of about 60 cm in length toward the portion of the cave ceiling where the bats are roosting, wounding individuals that fall to the ground. The other hunters remain at the mouth of the cave with waving tree branches to inhibit the bats from exiting, and at the same time wounding other individuals that encounter the branches. In general, each "hunt" lasts for up to 1 hour and may yield between 30-40 individuals. During the hunting months, the cave may be visited up to once a week, hence an estimated maximum of 360-480 bats could be taken locally each year.

Little is known about the day roost sites of *Mops midas* on Madagascar (ANDRIAFIDISON et al. 2006) and here we present a few details from a tree roost on Nosy Be. The tree was in the middle of the small village of Antsanolana, 5.4 km NNW of Hell-Ville (the principal city on the island), at 110 m above sea level. The Malagasy vernacular name of the tree was given as "mantaly", which according to SCHATZ (2001) is a Terminalia (Family Combretaceae). The tree had a height of about 10 m and a diameter at breast height of 45 cm, and was surrounded by about 30 small houses of classical coastal architecture and with the roofs made of palm or Ravenala leaves. About 8 m above the ground there was a round hole in the hollow trunk of about 15 cm in diameter, from which the animals exited and the sounds of bats could be heard from a small hole near ground level. Older villagers of Antsanolana mentioned that bats had occupied the tree since they could remember, and they believed that the bats were their reincarnated ancestors.

Even though netting effort was not equal on the different islands (see Table 2), several conclusions can be drawn, from the comparisons between Nosy Be and Ile Sainte-Marie. Although sampling effort on the latter island was almost double that on the former island (Table 2), species richness and density were notably reduced. Excluding fruit bats, only two species of Chiroptera were documented on Ile Sainte-Marie, plus the older specimen record of *Miniopterus manavi* (Table 1). Capture rates with the use of mist nets were nearly an order of magnitude greater on Nosy Be than on Ile Sainte-Marie. Further, on Ile Sainte-Marie a considerable effort was made, through direct inspection and interviews with local people, to locate bat roosts in synanthropic settings. However, not a single such roost was located. In contrast, on Nosy Be it was difficult to find a village or town without a molossid day-roost within a building.

Of the islands surveyed, the capture rate was highest on Nosy Komba (Table 2). During the course of two nights netting on the island, 193 NMH were accrued on trails in a relatively extensive area of forest composed of native and introduced trees. A large percentage of the captured bats were *Rousettus madagascariensis* and, during our visit, there were numerous *Ficus* trees in fruit within the forest. No roost site is known from the island for this species, this information includes that of the local guides. *Rousettus* were captured within 15 minutes after dark, which would preclude the possibility that they arrived from day roosts on the main island.

Why Ile Sainte-Marie should have such reduced populations and species richness of bats is an intriguing question. The original vegetation of both Ile Sainte-Marie and Nosy Be would have been humid forest, although there is a more pronounced dry season on the latter island. The amount of natural forest, albeit disturbed, occurring on these two islands is more or less equivalent. Both islands were visited during the rainy season and hence the question of seasonality cannot be invoked. The minimum distance between the main island and Ile Sainte-Marie is 7 km and between the main island and Nosy Be is 13 km. Water depths between these islands and the main island are shallow and they would have been attached in the Quaternary during periods of glacial maxima, when sea levels dropped. Hence, distance for dispersal from the main island or other parameters cannot easily explain the observed differences in species richness or bat density between these two islands. A historical catalogue of Ile Sainte-Marie's mammalian fauna does not indicate that there has been any subsequent extinction within the bat fauna (SGANZIN 1840).

The eastern coast of Madagascar is more prone to devastating cyclonic winds than the western coast, which ravages certain zones, including Ile Sainte-Marie. Perhaps this is an important factor. This meteorological aspect, combined with the observation that many of the bat species occurring on Nosy Be and Ile Sainte-Marie are probably of African origin, suggests that the latter island maybe in the dispersal shadow of Madagascar. This might be an appropriate explanation for observed low densities and species richness at Ile Sainte-Marie. As a further corollary to this point, none of the species recorded on Nosy Be or Nosy Komba are known to occur in the Mascarene Islands to the east (CHEKE and DAHL1981, MOUTOU 1982).

Acknowledgements
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Appendix I.

List of representative specimens for each taxon collected during the course of the inventories of Nosy Be, Nosy Komba, and Ile Sainte-Marie. Specimens to be divided between the Field Museum of Natural History and the Département de Biologie Animale, Université d'Antananarivo. Collector acronyms: ER = E. N. Rakotonandrasana, SMG = S. M. Goodman.

***Pteropus rufus* E. Geoffroy St.-Hilaire, 1803**
Nosy Be: Vicinity of Ambatozavavy (SMG-15042); Ile Sainte-Marie: Forêt de Kalalao, S 16°55'12.4" (approx.),E 49°52'37.2" (approx.), 60 m (SMG-15295).

***Rousettus madagascariensis* G. Grandidier, 1929**
Nosy Be: Centre Nationale de Recherche Océanographique, S 13°24.4', E 48°17.5', 10 m (SMG-15161); Nosy Be: Ambanoro, S 13°24.420', E 48°18.172', 10 m (ER-003); Nosy Be: Zone périphérique RNI de Lokobe, S 13°24.518', E 48°18.207', 40 m (ER-008); Nosy Be: Ambonara, S 13°23.742', E 48°15.548', 30 m (ER-029); Nosy Be: Ampombilava, S 13°23.841', E 48°14.872', 15 m (ER-034); Nosy Be: Ambonara (lavage), S 13°23.550', E 48°15.842', 35 m (ER-039); Nosy Be: Djabalabe, S 13°22.530', E 48°15.322', 60 m (ER-044); Nosy Be: Beomby, S 13°20.412', E 48°14.517', 210 m (ER-050); Nosy Be: Mont Passot, S 13°18.905', E 48°14.062', 260 m (ER-056); Nosy Komba: Ampangorinana, S 13°26.835', E 48°20.466', 100 m (SMG-15238); Nosy Komba: Edge of Ampangorinana, S 13°26.717', E 48°20.806', 25 m (SMG-15258); Ile Sainte-Marie: Grotte d'Ankarena, S 17°05.313', E 49°49.605', 20 m (SMG-15279); Ile Sainte-Marie: Anivorano, S 16°48.980', E 49°55.694', 3 m (ER-081); Ile Sainte-Marie: Iriana, S 16°48.720', E 49°56.139', 6 m, (ER-083); Ile Sainte-Marie: Ambatorao, S 16°45.538', E 49°58.814', 26 m (ER-085); Ile Sainte-Marie: Maromandia, S 16°54.161', E 49°52.345', 2 m (ER-086); Ile Sainte-Marie: Ifotatra, S 16°48.099', E 49°57.376', 10 m (ER-088); Ile Sainte-Marie: Ambohidenabe, S 16°51.359', E 49°56.869', 22 m (ER-090); Ile Sainte-Marie: Sahasifotra, S 16°51.957', E 49°56.415', 30 m (ER-092); Ile Sainte-Marie: Anafiafy, S 16°54.513', E 49°55.041', 50 m (ER-095); Ile Sainte-Marie: Maromandia-Ambohitra, S 16°56.275', E 49°53.062', 70 m (ER-097); Ile Sainte-Marie: Ankobahoba, S 16°56.858', E 49°54.148', 60 m (ER-098); Ile Sainte-Marie: Lohatrozona, S 16°57.737', E 49°54.005', 40 m (ER-100); Ile Sainte-Marie: Ambodiforaha, S 17°02.091', E 49°51.334', 25 m (ER-103).

***Emballonura atrata* Peters, 1874**
Ile Sainte-Marie: Lonkintsy, S 16°52.768', E 49°52.894', 2 m (ER-075).

***Emballonura tiavato* Goodman, Cardiff, Ranivo, Russell, and Yoder, 2006**
Nosy Be: Centre Nationale de Recherche Océanographique, S 13° 24.4', E 48°17.5',10 m (SMG-15170); Nosy Be: Ampasindava, S 13°24.829', E 48°18.346', 5 m (SMG-15176); Nosy Komba: Ampangorinana, S 13°26.835', E 48°20.466', 100 m (SMG-15230).

***Chaerephon leucogaster* (A. Grandidier, 1869)**
Nosy Be: Hell Ville (building of Prefecture), S 13°24'25.4", E 48°16'42.5", 10 m (SMG-15035); Nosy Be: Dzamandzar (Centre de Santé), S 13°21'09.9", E 48°11'30.7", 10 m (SMG-15062); Nosy Be: Zone périphérique RNI Lokobe, S 13°24.308', E 48°18.201', 60 m (ER-018); Nosy Be: Ambatozavavy, S 13°22.012', E 48°18.927', 8 m (ER-067); Nosy Komba: Ampangorinana (Centre de Santé), S 13°26.562', E 48°20.874', 10 m (SMG-15260).

***Chaerephon pumilus* (Cretzschmar, 1826)**
Nosy Be: Centre Nationale de Recherche Océanographique, S 13°24.4', E 48°17.5', 10 m (SMG-15167).

***Mops leucostigma* (G.M. Allen, 1918)**
Nosy Be: Hell Ville (Square Victor Rouvier), S 13°23'45.7", E 48°16'08.7", 15 m (SMG-15003); Nosy Be: Hell Ville (Service Veterinaire), S 13°23'30.2", E 48°15'30.2", 20 m (SMG-15012); Nosy Be: Hell Ville (Building of Prefecture), S 13°24'25.4", E 48°16'42.5", 10 m (SMG-15027); Nosy Be: Dzamandzar (Ecole Primaire), S 13°21'08.2", E 48°11'27.5",10 m (SMG-15045); Nosy Be: Dzamandzar (Centre de Santé), S 13°21'09.9", E 48°11'30.7",10 m (SMG-15068); Nosy Be: Marodoka, S 13°24.067', E 48°18.009', 5 m (SMG-15146); Nosy Be: Centre Nationale de Recherche Océanographique, S 13°24.4', E 48°17.5', 10 m (SMG-15171); Nosy Be: EPP d'Antanamitarana, S 13°16.184', E 48°12.155', 30 m (SMG-15203); Nosy Be: Dzamandzar (Usine de SIRAMA), S 13°21.1', E 48°11.8', 25 m (SMG-15213); Nosy Be: Ambonara, S 13°23.742', E 48°15.548', 30 m (ER-028); Nosy Be: Ambatozavavy, S 13°22.012', E 48°18.927', 8 m (ER-074).

***Mops midas* (Sundevall, 1843)**
Nosy Be: Antsanolana, S 13°21.745', E 48°15.509', 110 m (ER-061).

***Hipposideros commersoni* (E. Geoffroy St.-Hilaire, 1813)**
Nosy Be: Centre Nationale de Recherche Océanographique,S 13°24.4', E 48°17.5', 30 m (SMG-15199).

***Myotis goudoti* (A. Smith, 1834)**
Nosy Be: Centre Nationale de Recherche Océanographique, S 13°24.4', E 48°17.5', 30 m (SMG-15197); Nosy Be: Ambanoro, S 13°24.420', E 48°18.172', 10 m (ER-001, 002); Nosy Be: Zone périphérique RNI Lokobe, S 13°24.308', E 48°18.201', 60 m (ER-020); Nosy Be: Rapale, S 13°20.412', E 48°14.517', 210 m (ER-049); Nosy Komba: Ampangorinana, S 13°26.835', E 48°20.466', 100 m (SMG-15233, 15235); Nosy Komba: edge of Ampangorinana, S 13°26.717', E 48°20.806', 25 m (SMG-15259).

***Miniopterus gleni* Peterson, Eger and Mitchell, 1995**
Ile Sainte-Marie: Grotte d'Ankarena, S 17°05.313', E 49°49.605', 20 m (SMG-15286).

***Miniopterus manavi* Thomas, 1906**
Nosy Komba: Ampangorinana, S 13°26.835', E 48°20.466', 100 m (SMG-15234); Nosy Be: Périphérie RNI Lokobe, S 13°24.308', E 48°18.201', 60 m (ER-021).

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RECENT LITERATURE

PUBLISHED PAPERS

ANDRIAFIDISON, D., ANDRIANAVOARIVELO, R. A., RAMILIJAONA, O. R., RAZANAHOERA, M. R., MACKINNON, J., JENKINS, R. K. B., and RACEY, P. A., 2006. Nectarvory by endemic Malagasy fruit bats during the dry Season. *Biotropica* 38(1): 85-90.

Left: The flower of the Baobab (*Adansonia grandidieri)* opens at night and is visited by fruit bats and occasionally lemurs.

ANDRIANAVOARIVELO, R. A., RANAIVOSON, N., RACEY, P. A., and JENKINS, R. K. B., 2006. The diet of three synanthropic bats (Chiroptera: Molossidae) from eastern Madagascar. *Acta Chiropterlogica* 8(2): 439-444.

Above: Peters' Goblin bat (*Mormopterus jugularis*), a widespread endemic species that frequently roosts in buildings.

Abstract: We analysed 890 faecal samples from 145 molossid bats in eastern Madagascar during the austral summer and winter. Coleoptera, Hemiptera, Lepidoptera and Diptera were the most important sources of food for *Mops leucostigma*, *Mormopterus jugularis* and *Chaerephon pumilus*. The percentage volume of Hemiptera and Lepidoptera were similar in the diet, pooled across season, for all species but significant differences were found for Diptera and Coleoptera. *Mops leucostigma*, however, had the highest volume of Diptera and *M. jugularis* of Coleoptera. Hemiptera were an important food source for all species during both seasons, whereas Coleoptera were prevalent in the diet only during the summer. Diptera were rarely eaten by *M. jugularis* but constituted a major source of food for the other two species during the winter. Although there was little evidence of strong interspecific dietary partitioning, *M. jugularis* appeared to have a more limited dietary composition at the ordinal level. Major differences in dietary composition were between season rather than species at the ordinal level. Further investigations are recommended to assess the potential role of molossids in consuming economic pests of cotton in Madagascar.

AVENANT, N. L., 2005. Barn owl pellets: a useful tool for monitoring small mammal communities? *Belgian Journal of Zoology* 135(supplement): 39-43.

Abstract: Monthly fluctuations in the diet of Barn owl *Tyto alba* were compared to prey availability in a typical South African dry sandy highveld grassland over a 12 month period. Mice, shrews, bats, birds and insects were all major prey items, and their contribution in pellets fluctuated significantly over months. Barn owl proved to be very efficient samplers of the small mammal prey group : not only was the owl more successful than museum personnel in sampling the variety of species present during a specific time of year, but peaks in prey utilization were also more characteristic of actual fluctuations than that found by traps. Owl pellet analysis is a valuable asset during small mammal monitoring studies, and is especially useful for sampling small mammal indicator species during environmental impact assessments. However, owl pellet analysis should never be seen as an alternative for small mammal trapping when small mammal community structure is the focus of study.
Keywords: bat; Bats; birds; Community; species; *Tyto alba*.

BARCLAY, R. M. R., BARCLAY, L. E., and JACOBS, D. S., 2006. Deliberate insectivory by the fruit bat *Rousettus aegyptiacus*. *Acta Chiropterologica* 8(2): 549-553.

Above: Three Egyptian fruit bats (*Rousettus aegyptiacus*) in the palm where they sat to eat figs and insects. The bat in the middle has a radio-transmitter.

BATES, P. J. J., RATRIMOMANARIVO, F. H., HARRISON, D. L., and GOODMAN, S. M., 2006. A description of a new species of *Pipistrellus* (Chiroptera: Vespertilionidae) from Madagascar with a review of related Vespertilioninae from the island. *Acta Chiropterologica* 8(2): 299-324.

Abstract: Six species of small vespertilionid bat were recently collected in Madagascar. *Neoromicia matroka* (included by some in *Eptesicus*) and *N. malagasyensis* were already recorded from the island. *Pipistrellus hesperidus* was known but under a different name, *P. kuhlii*. *Neoromicia melckorum* is a new species record for the island. *Hypsugo anchietae* represents a new species and genus record. The last taxon is a previously undescribed species of *Pipistrellus* , which shows affinities to three South-east and East Asian pipistrelle taxa. In this paper, the new species is described and further information on the taxonomy, distribution, ecology, and behaviour of all six taxa are provided.
Keywords: Chiroptera; description; distribution; *Hypsugo anchietae*; Madagascar; *Neoromicia melckorum*; *Pipistrellus* sp.nov.; species; taxonomy; Vespertilionidae; Vespertilioninae.

BIEK, R., WALSH, P. D., LEROY, E. M., and REAL, L. A., 2006. Recent common ancestry of Edola Zaire virus found in a bat reservoir. *PLos Pathogens* 2(10): 885-886.

GOODMAN, S. M., 2006. Hunting of Microchiroptera in south-western Madagascar. *Oryx* 40(2): 225-228.

Abstract: In February 2005 clear evidence was found of extensive hunting by local people of microchiropteran bats in south-western Madagascar. *Hipposideros commersoni* (Family Hipposideridae) accumulates heavy fat deposits during this period, weighing on average about 50 g, and is the targeted species. The capture of other smaller species of microchiropterans appears to be incidental. The exploitation of bats for bushmeat in this region takes place during a period of food shortage, and because the level of collection surpasses the breeding potential of these animals it may over time result in extirpation of local populations.
Keywords: caves; Hipposideridae; *Hipposideros commersoni*; hunting; Madagascar; Microchiroptera; south-western Madagascar; species.

GOODMAN, S. M., and GRIFFITHS, O., 2006. A case of exceptionally high predation levels of *Rousettus madagascariensis* by *Tyto alba* (Aves: Tytonidae) in western Madagascar. *Acta Chiropterologica* 8(2): 553-556.

Keywords: Madagascar; predation; *Rousettus*; *Rousettus madagascariensis*; *Tyto alba*; western Madagascar.

GOODMAN, S. M., RAKOTONDRAPARANY, F., and KOFOKY, A., 2007. The description of a new species of *Myzopoda* (Myzopodidae: Chiroptera) from western Madagascar. *Mammalian Biology* 72(2): 65-81.

Abstract: A new species of *Myzopoda* (Myzopodidae), an endemic family to Madagascar that was previously considered to be monospecific, is described. This new species, *M. schliemanni*, occurs in the dry western forests of the island and is notably different in pelage coloration, external measurements and cranial characters from *M. aurita*, the previously described species, from the humid eastern forests. Aspects of the biogeography of *Myzopoda* and its apparent close association with the plant *Ravenala madagascariensis* (Family Strelitziaceae) are discussed in light of possible speciation mechanisms that gave rise to eastern and western species.
Keywords: *Myzopoda*; Madagascar; new species; biogeography.

IEHLÉ, C., RAZAFITRIMO, G., RAZAINIRINA, J., ANDRIAHOLINIRINA, N., GOODMAN, S. M., FAURE, C., GEORGES-COURBOT, M.-C., ROUSSET, D., and REYNES, J.-M., 2007. Henipavirus and Tioman virus antibodies in Pteropodid bats, Madagascar. *Emerging Infectious Diseases* 13(1): 159-161.

Abstract: Specimens were obtained from the 3 Malagasy fruit bats, *Pteropus rufus*, *Eidolon dupreanum*, and *Rousettus madagascariensis*. Antibodies against Nipah, Hendra, and Tioman viruses were detected by immunoassay in 23 and by serum neutralization tests in 3 of 427 serum samples, which suggests that related viruses have circulated in Madagascar.
Keywords: Madagascar; pteropodid bats.

LEADER, N., MOKADY, O., and YOM-TOV, Y., 2006. Indirect flight of an African bat to Israel: An example of the potential for Zoonotic Pathogens to move between continents. *Vector-Borne and Zoonotic Diseases* 6(4): 347-350.

Abstract: The transmission of harmful pathogens during commercial air flights is an increasing health concern. A potential, yet relatively overlooked source of zoonotic infectious diseases involves collisions of birds and bats with aircraft and long distance transport of their carcasses. We report a case of aerial transportation of the remains of an African fruit bat over three continents, following a collision with an aircraft, and demonstrate the relative ease with which zoonotic pathogens, such as rabies virus or other viruses associated with bats, may cross national boundaries and continents even. Improper handling and disposal of animal remains by airport personnel, may lead to exposure of both humans and local fauna to exotic pathogens. This in turn may trigger an epidemic with potentially devastating results.
Keywords: Air collision; Bats; birds; fauna; flight; infectious disease; Israel; Long-range transmission; rabies; Zoonotic pathogens.

PAWESKA, J. T., BLUMBERG, L. H., LIEBENBERG, C., HEWLETT, R. H., GROBBELAAR, A. A., LEMAN, P. A., CROFT, J. E., NEL, L. H., NUTT, L., and SWANEPOEL, R., 2006. Fatal Human Infection with Rabies-related Duvenhage Virus, South Africa. *Emerging Infectious Diseases* 12 (12): 1965-1967.

Abstract: Duvenhage virus was isolated from a patient who died of a rabies like disease after being scratched by a bat early in 2006. This occurred ~80 km from the site where the only other known human infection with the virus had occurred 36 years earlier.

LAMB, J. M., ABDEL-RAHMAN, E. H., RALPH, T., FENTON, M. B., NAIDOO, A., RICHARDSON, E. J., DENYS, C., NAIDOO, T., BUCCAS, W., KAJEE, H., HOOSEN, N., MALLETT, D., and TAYLOR, P. J., 2006. Phylogeography of southern and northeastern African populations of *Otomops martiensseni* (Chiroptera: Molossidae). *Durban Museum Novitates* 31: 42-53.

Above: A colony of the Large-eared Free tailed bat (*Otomops martiensseni*) day roosting in the roof of a house in Durban.

Above: Large-eared Free tailed bat (*Otomops martiensseni*) held in the hand.

Abstract: The rare, large-eared free-tailed bat *Otomops martiensseni* is sparsely distributed throughout sub-Saharan Africa and Yemen. Whilst currently considered conspecific, South African populations from the Durban metropolitan region were previously regarded to be distinct (*O. icarus*) from populations elsewhere in Africa (*O. martiensseni*) and Madagascar (*O. madagascarensis*). We used DNA sequencing of the cytochrome b gene (1034 base pairs, n=17), the mitochondrial control region, or d-loop (208 base pairs, n=16), and random amplification of polymorphic DNA fragments (PCR-RAPDs; n=74), to investigate phylogeographic structure in geographically distant (> 3000 km) populations from Kenya (one colony), Ethiopia (one colony) and South Africa (Durban: seven colonies). Phylogenetic analysis of cytochrome b sequences revealed two well-supported (100% bootstrap), but genetically similar (2.5% divergence) lineages, from northeastern and South Africa. The cytochrome b haplotype network showed a minimum of 22 mutational steps between northeastern and southern clades, and, within each clade (particularly Durban), a high number of unique haplotypes with multiple mutational steps (4-12) between sequential haplotypes. Based on phylogenetic analysis of d-loop sequences, colonies from Ethiopia and Kenya formed one clade, whereas other colonies sampled formed distinct and widely separated clades; one Durban colony (Pinetown) was phylogenetically intermediate between another Durban colony 30 km away (Ballito), and the Kenyan/Ethiopian clade (> 3000 km apart), suggesting multiple north-south or south-north dispersal events. Grouped-colony PCR-RAPD data revealed slight nucleotide divergence between East and South African populations (0.9%), with considerable overlap of individuals between colonies and high intra-colony divergences (0.19% for Utundu Cave in Kenya, and 0.54-2.16% for five Durban colonies). Both nucleotide and haplotype diversity was higher in the southern than in the northeastern clade, possibly in part due to differences in roosting biology (numerous dispersed house roosts in Durban versus single large cave colonies in northeastern Africa). Genetic data were explained by a combination of high-altitude, long-distance flight capabilities of the species, migration events, and female philopatry resulting from stable harems, at least in the Durban population.
Keywords: Africa; Chiroptera; flight; Madagascar; *Otomops martiensseni*; South Africa; species.

ERRATUM (LAMB *et. al.*, DURBAN MUS. NOVIT. 31 : 42-53.) - At time of going to press, a technical error in D-loop sequence data for Pinetown samples was detected. Thus, Figure 5, and discussion relevant to it, should be disregarded and the apparent close D-loop sequence relationship between Pinetown (Durban) and East African individuals of *Otomops martiensseni* is spurious.

RANDRIANANDRIANINA, F., ANDRIAFIDISON, A., KOFOKY, A. F., RAMILIJAONA, O., RATRIMOMANARIVO, F., RACEY, P. A., and JENKINS, R. K. B., 2006. Habitat use and conservation of bats in rainforest and adjacent human-modified habitats in eastern Madagascar. *Acta Chiropterlogica* 8(2): 429-437.

Above: The Malagasy mouse-eared bat (*Myotis goudoti*), a species that forages inside the rainforest in Parc National de Mandadia, Madagascar.

Abstract: We used roost searches, mist netting and acoustic sampling to investigate the habitats used by bats in Parc National de Mantadia and the Réserve Spéciale d'Analamazaotra, eastern Madagascar. Four species were caught in relatively intact humid forest (*Myotis goudoti*, *Miniopterus manavi*, *Miniopterus majori* and *Emballonura atrata*) two in agricultural land, *Neoromicia matroka* and *Neoromicia melckorum*, and one, *Rousettus madagascariensis* , in *Eucalyptus* plantations. *Mormopterus jugularis*, *Chaerephon pumilus* and *Mops leucostigma* were found roosting in buildings ca. three km from the humid forest. Acoustic sampling revealed that *Neoromicia* spp. and molossids were ubiquitous and were recorded from intact and degraded humid forest, *Eucalyptus* plantations and agricultural land. *Myotis goudoti* showed the strongest association with intact humid forest. Taxon richness, determined by acoustic sampling, was highest in humid forest but activity was highest in plantations and agricultural land. Mixed-habitat landscapes that surround protected forests and consist of a mosaic of regenerating forest, agriculture, wetlands, villages and plantations are important for bats and promote chiropteran diversity because they provide roosting and foraging sites for species that rarely use intact forest. The humid forests of eastern Madagascar have lower bat diversity than the island's western deciduous karst forests.

RANIVO, J., and GOODMAN, S. M., 2006. Révision taxinomique des *Triaenops malgaches* (Mammalia, Chiroptera, Hipposideridae). *Zoosystema* 28(4): 963-985.

Abstract: *Taxonomic revision of Malagasy* Triaenops *(Mammalia, Chiroptera, Hipposideridae).* Three different species of *Triaenops* Dobson, 1871 are often recognized as occurring on Madagascar: *T. rufus* A. Milne-Edwards, 1881, *T. furculus* Trouessart, 1906, and *T. auritus* G. Grandidier, 1912. Another named species, *T. humbloti* A. Milne-Edwards, 1881, is generally considered a synonym of *T. rufus*. Further, several authors have treated *T. auritus* as a synonym of *T. furculus*. The holotype of *T. furculus* was obtained near Sarodrano in the extreme southwest, *T. auritus* in the general vicinity of Diégo-Suarez (= Antsiranana), and *T. rufus* in the east. Using recent collections of 145 *T. furculus* and 115 *T. rufus* specimens from 15 different sites in the drier portions of Madagascar we conducted a detailed morphometric study (9 external, 13 cranial, 12 dental and 11 wing measurements) to assess patterns of geographic variation in members of this genus. The results indicate that *T. auritus* is distinct from *T. furculus* and occurs in the northern and northwestern portion of the island. *Triaenops furculus* is limited to the drier forest formations of the west central and southwest. *Triaenops rufus* shows no notable patterns of geographic variation across its broad range in the drier portions of the island.

Keywords: Chiroptera; Geographic variation; Hipposideridae; Madagascar; Mammalia; measurements; morphometric; revision; species; *Triaenops*; variation.

RANIVO, J., and GOODMAN, S. M., 2007. Patterns of ecomorphological variation in the bats of western Madagascar: Comparisons among and between communities along a latitudinal gradient. *Mammalian Biology* 72(1): 1-13.

Abstract: The ecomorphology of 10 insectivorous bat species at three study zones in western Madagascar was examined using 567 specimens and based on 6 external, 11 cranial, 12 dental, and 11 wing measurements. The three study sites are located along a cline representing 11.61 of latitude. The southern most site has notable differences in vegetational and climatic regimes than the two more northern sites. Principal component analyses were conducted for each of the four datasets to examine the morphological space occupied by each species at the three sites. Most taxa showed clear intra-site separation and little inter-site variation. The exceptions included extensive morphological overlap in two taxa of *Triaenops* (cranial, dental, and wing), that have allopatric distributions, and between the sympatric *Miniopterus manavi* and *Myotis goudoti* (external, cranial, and dental). In the latter case, there was distinct separation in wing shape between these two taxa, which would allow them to exploit local habitats and prey in different manners. The only species that showed considerable inter-site variation was *Hipposideros commersoni*, which is sexually dimorphic, with individuals from the south being smaller than those in the north. Keywords: Bats; Chiroptera; Community; ecomorphology; latitudinal gradient; Madagascar; species; variation; western Madagascar.

RANIVO, J., and GOODMAN, S. M., 2007. Variation géographique de *Hipposideros commersoni* de la zone sèche de Madagascar (Mammalia, Chiroptera, Hipposideridae). *Verh naturwiss Ver Hamburg* (NF) 43: 33-56.

Abstract: Patterns of geographic variation of *Hipposideros commersoni* were studied in the dry and western portions of Madagascar. This project was conducted on the basis of 20 external, 13 cranial, and 12 dental characters taken from 81 specimens collected at 11 different localities. These 11 localities were subsequently regrouped into 6 different "operational taxonomic units". Given that there is strong sexual dimorphism in this taxon, the sexes were treated separately in the analyses. The results indicate that females show notable latitudinal variation, with the individuals in the north being distinctly larger than those in the south. Males do not show the same pattern. A principal component analysis demonstrates that for each sex two groups can be distinguished: 1) individuals occurring from Analamerana to Ankarana and then south to Bemaraha and 2) specimens collected in the area between Isalo and Tsimanampetsotsa. At Isalo there appears to be two distinct morphotypes, one of which is notably small and typical of the southern populations and the other distinctly larger and similar to individuals from Ankarana. This polymorphism can be possibly explained by the local presence of two forms at this site or intra-island movements of individuals from the north. [in French, English Abstract].

Keywords: Chiroptera; Geographic variation; Hipposideridae; *Hipposideros*; *Hipposideros commersoni*; Madagascar; Mammalia; variation.

RASOMA, J., GOODMAN, S. M., 2007. Food habits of the Barn Owl (*Tyto alba*) in spiny bush habitat of arid southwestern Madagascar. *Journal of Arid Environments* 69: 537-543.

Abstract: The food habits of the Barn Owl (*Tyto alba*) are relatively well documented across its Madagascar range based on pellet contents, with the exception of the arid zone of the extreme southwest. New data are presented herein to fill this void. The diet of this owl consists largely of introduced rodents and there are some marked seasonal differences in the other types of prey taken. Evidence is presented to support the hypothesis that this owl has been able to expand its distribution in the wake of human habitat disturbance and the associated trophic proliferation of non-native rodents in disturbed habitats.

Keywords: Tyto alba; Prey choice; Introduced small mammals; Range expansion; Madagascar.

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